

The Combined Effect of Listeners' Language Background and L2 English Teaching Background on Mutual Intelligibility: a Mixed-Methods Approach

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ABSTRACT

Achieving and maintaining mutual intelligibility between interlocutors has been emphasized in the second language (L2) pronunciation acquisition and pedagogy. Although previous studies identified some listener background factors that contribute to enhancing non-native speakers' (NNS) speech intelligibility, little studies investigated linguistic and non-linguistic background factors together. Hence, the present study investigated the combined effect of listeners' language background and L2 English teaching background factors by using mixed-methods approach. This study conducted intelligibility transcription task of 60 listener participants who were divided into 4 listener groups according to listeners' L1 and L2 teaching experience. The study found that Koreans' speech was more intelligible to L1 Korean teachers than to native English (NE) non-teachers when both listeners' language and L2 teaching experience were considered. In addition, qualitative analysis of the transcription task showed that L1 Korean teachers demonstrated more accurate perception than NE listeners to transcribe certain words or phrases uttered by some L1 Korean speakers. The present study found additional evidence for complex and subtle nature of mutual intelligibility, which reacts sensitively towards multitudes of listener background factors. It also found the positive effect of L2 English teaching experience on foreign-accented speech intelligibility.

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I. Introduction

Intelligibility of speech is reckoned to be one of the most important constructs for speech perception. It is because intelligibility is related mostly to the clarity of speech, which determines how much the speaker's intended message was fully delivered and understood by the target listener (Derwing & Munro, 2015). Intelligibility is an especially important factor for the perception of non-native speaker's (NNS) speech because they are the speakers of the second language (L2), which makes a certain degree of deviation in pronunciation or limitation in using lexicogrammatical feature inevitable. Recent frameworks such as World Englishes (WEs), English as an International Language (EIL), and English as a Lingua Franca (ELF), (Jenkins, 2000; Jenkins, 2006; Kachru, 1992) acknowledged the fact that the population of non-native speakers of English (NNES) is almost as twice as much as the NS population (Ethnologue, 2018). In other words, NNES is no longer the marginal group of English users so the English spoken by these group of NNS should be viewed differently from before. WEs, EIL, and EFL reflected the move towards accepting some of these limits or deviations as new English variety that is used amongst NNS, as long as they are intelligible to other listeners (Jenkins, 2000). In other words, achieving and maintaining mutual intelligibility has been emphasized in the second language (L2) pronunciation acquisition and pedagogy more than speaking nativelike English.

As mutual intelligibility has been prioritized to be the second language (L2) pronunciation learning goal over time, many studies have been conducted on the relative contribution of the various listener and speaker background factors. Such factors include language background (Major, Fitzmaurice, Bunta, & Balasubramanian, 2002; Munro, Derwing, & Morton, 2006), target language proficiency (Bent & Bradlow, 2003; Lim, Han, Choi, & Lee, 2016), professional background (Galloway, 1980; Hadden, 1991; Brown, 1995), foreign accent familiarity (Gass & Varonis, 1984; Kennedy & Trofimovich, 2008; Pinet, Iversion, & Huckvale, 2011), and others. Out of these factors, language background, which indicate listener and speakers' first language (L1), is well recognized to contribute greatly in foreign accent intelligibility. Language background is considered to be instrumental in achieving L2 pronunciation intelligibility, since how L1 phonological system is structured and operated greatly influences learners' formation and development of L2 learners' interlanguage. Although the notion of interlanguage emphasizes the emergence of learner language, learners' L1 still is important since it is the starting ground of learners' perception and production of sounds, which affect L2 phonological representations. Language background also is related to the kind of learner difficulty that is likely to arise in the midst of L2 language learning and language use.

Having identified language background to be one of the key factors for mutual intelligibility, researchers began to include both NS and NNS listener participants and measure their response towards NNS speech. Studies from the early 2000s began to measure the response of NNS listeners in terms of intelligibility through comparing the degree of intelligibility when they listened to NS speakers, NNS speakers who share the L1 with the listeners, and NNS speakers who do not share the L1 with them. Some studies found that mutual intelligibility between NNS speaker- NNS listener was as good as or sometimes higher than the intelligibility between NNS speaker- NS listener when speaker and listener shared the L1. Bent and Bradlow (2003) coined the term Interlanguage Speech Intelligibly Benefit (ISIB) to describe this propensity, entitling that enhanced intelligibility as 'benefits' gained by their L1. Ever since then, ISIB studies involving NNS speakers and listeners have been conducted in various ESL and EFL environment. However, the findings from those studies have been inconsistent, in terms of the intensity and kind of the benefit.

If NNS speech intelligibility is influenced by numbers of linguistic background factors, it would also be influenced by other non-linguistic background factors. Out of many others, one of the non-linguistic listener background variables which may worth investigating would be listeners' L2 English teaching experience. Investigating L2 English teachers' intelligibility towards NNS speech may be meaningful since they are the group of professionals who actually listen and give the most immediate feedback to these learners' utterance in the L2 classroom. Hence, having a deeper understanding about L2 English teachers' NNS speech intelligibility according to their language background may deepen our understanding about the possible influence given to learners of English in L2 language classroom, either in ESL or EFL context. Previous studies on listeners' professional background were mostly done in language assessment field, and they agreed that teacher listeners were more sensitive towards linguistic and pronunciation related factors (Galloway, 1980; Hadden, 1991; Kim, 2009) compared to non-teacher listeners. In addition, study like Kim (2009) found that even amongst L2 English teachers, teachers' L1 background and their trained context may influence the way they listen and rate NNS speech, in terms of severity/leniency, or the directionality of speech evaluation (i.e., focus on lexicogrammatical aspect of speech, focus on logical development of speech). Previous studies, however, provided little empirical evidence or insights about L2 English teachers' response to NNS speech as a communication partner. To my knowledge, most previous studies ended up in measuring intelligibility of student listeners in universities from ESL or EFL context; so far, little is known about what intelligibility is like when listeners are teachers of L2 English. Considering that possible listener group of L2 learners' utterance is "confined to English classrooms in the school, especially for students in EFL environment" (Jeong, 2016: 2), it is necessary to include

L2 teaching experience as part of listener variable. Investigating how learners are heard to this group of listeners, and how would that be different from another group of listeners can be meaningful that way. That way it would reflect more accurately portray the reality that L2 learners will face once they learn to speak L2.

The purpose of the present study is to investigate the combined effect of listeners' L2 English teaching background, along with the effect of language background on NNS speech intelligibility. The present study's goal was to see whether the degree of NNS intelligibility is measured differently when listeners' background is defined only by language background, and when listeners' background includes listeners' L2 English teaching background. In doing so, the present study selected mixed-methods approach; listeners' responses to NNS speech were not only analyzed quantitatively, but also qualitatively. This study did so to identify and locate the source that creates the perceptual difference among listeners with varying combination of linguistic and L2 teaching background. In addition, this study hopes to provide some phonological interpretation, along with statistical interpretation of NNS speech intelligibility. This study attempted to answer these research questions:

1. What is the single effect of language background on NNS speech intelligibility benefits?
2. What is the combined effect of language background with L2 English teaching background on NNS speech intelligibility benefits?
3. How does NNS-NNS intelligibility differ from NS-NNS intelligibility when NNS listener is L2 English teacher?

II. Literature Review

A. Intelligibility of NNS speech and ELF

Intelligibility is the extent to which a speaker manages to deliver their originally intended message clearly to the listener (Derwing & Munro, 2015). Whether one is speaking in one's L1 or L2, being intelligible to the conversation partner is an integral part of successful oral communication. For that reason, along with comprehensibility, accentedness, and fluency, intelligibility is enlisted as one of the key constructs to determine one's speaking competence and perception accuracy. Intelligibility is often distinguished from other constructs, however, since it is measured by the relatively objective criterion of perception (Yan & Ginther, 2017). While other two constructs leave room for listeners' subjective judgement or attitudes to affect the data output,

intelligibility can only be measured by absolute perception accuracy scores; either from listening comprehension test (Major et al., 2002), forced-choice identification test (Hayes-Harb, Smith, Bent, & Bradlow, 2008; Lee & Xue, 2013), or orthographic transcription test (Derwing & Munro, 1997; Bent & Bradlow, 2003).

Due to such communicative and objective nature of intelligibility, promotion of mutual intelligibility between listener and speaker has become a major goal of many learners and teachers of L2 pronunciation around the world. Focus on intelligibility in L2 pronunciation learning has led to a meaningful shift from producing more nativelike utterance to producing an intelligible utterance that may still have some acoustic features that are not strictly from American or British English. This shift in perspective is timely appropriate, especially when we discuss L2 English speech acquisition or mastery since English is no longer a language that is used on daily basis by native English speakers (NES). According to Ethnologue (2018), around 1.12 billion people in 118 countries are using English; out of them, around 378 million people use English as their L1 and around 743.5 million people are using English as their L2. It means that NNS population is almost as twice as much as NES. As this tendency has prolonged for more than a decade, the concept of WEs, EIL, and ELF (Jenkins, 2000; Jenkins, 2006; Kachru, 1992) consequently emerged and prevailed as well. The common aspect that these three concepts share is that they focus on aspects of English spoken by “speakers of different L1 who use English as mutual language (Lingua Franca) to communicate” (Celce Murcia, Brinton, & Goodwin, 2010: 33). These frameworks recognize NNS speech to be another unique variety of spoken English, instead of non-standard or erroneous utterance. Also, they are greatly interested in studying the linguistic form and characteristic of English verbally and orthographically exchanged between two parties of NNS of English, since they recognize NNS to be a legitimate and active user of English in their daily lives, instead of putting them in permanent language learner position.

B. Role of listeners' language background on intelligibility of NNS speech

The ELF framework not only denoted elevated position of NNS speech but also it called for new kinds of L2 English learning objective. L2 learners of English should not only be ready to meet NES as possible conversation partner after, but also NNS as a possible conversation partner. This is no exception to Korean EFL learners; their L2 English speech needs to be intelligible not only to NES from America or Britain, but also to NNS from Malaysia, Kenya, or even Korean. 정현성 (2017) predicted that “EFL Korean learners these days are more likely to meet and talk to NNS, than NES” (2017:

54). Although this may mean some degree of freedom from ideas like NS norm, it may also open up the box with some uncertainties because pronouncing English closer to NES no longer guarantees higher intelligibility of speech. These uncertainties, nevertheless, have led to increased attention towards the role that listeners' background could play on the degree of speech intelligibility, especially when the speaker is NNES.

A great volume of studies have been conducted to identify the source of intelligibility (Bent & Bradlow, 2003; Hayes-Harb et al., 2008; Lee & Xue, 2013; Lim et al., 2016; Munro et al., 2006; Stibbard & Lee, 2006), and many of them revealed that listeners' language background variables were contributing factor to moderate degree of NNS speech intelligibility. Linguistic background factor refers to the background information of listeners that shape their language experience. Some listeners' linguistic background variables found were as L1 (Bent & Bradlow, 2003; Munro et al., 2006; Major et al., 2002), degree of familiarity towards speakers' foreign accent (Gass & Varonis, 1984; Pinet, Iverson, & Huckvale, 2011), and amount of exposure to speakers' interlanguage or speaker group (Carey, Mannell, & Dunn, 2010; Kang, Rubin, & Lindemann, 2015). Language background was identified as a crucial factor that determined the phonological environment that listeners find more familiar and easily understandable while oral communication is taking place. Of all, listeners' L1 was identified as one of the most influential variables to determine intelligibility, as interlanguage is largely influenced by interlocutors' first language and its phonological system. This idea is rooted on Felge's (1981) phonological translation hypothesis, which believes that L2 speakers produce some sounds that are like a 'middle ground' between L1 and L2. L2 learners' interlanguage, which is the combination of learners' L2 input, L1 structures, language universals, and communication strategies. In other words, studying the effect of L2 language learners' L1 may give us more hints about the source of their NNES speech.

These studies of matched (or mismatched) speakers' and listeners' L1 effect on NNS speech perception discovered statistically significant intelligibility 'benefit' between different groups. Such the phonological instances when non-native listeners find non-native speakers to be at least as intelligible as the native speakers, due to their shared L1 effect, is termed as "Interlanguage Speech Intelligibility Benefit (ISIB)" (Bent & Bradlow, 2003: 671). Bent and Bradlow (2003)'s study is renowned to be a monumental one since they first coined the term ISIB and follow up studies began to call this shared L1 effect as ISIB ever since. They investigated sentence intelligibility of L2 English amongst adult NNES and listeners who share L1 (i.e., Korean speaker x Korean listener), and amongst non-native speakers and listeners who do not share a native language (i.e., Korean speaker x Mandarin listener). They found that both L1 Mandarin and Korean listeners scored higher when they heard the speech from the shared L1 speaker than Native

English speaker when non-native speakers' English proficiency was high. Their study suggested that not only non-native speakers were as intelligible as native speakers, several cases reported that they were more intelligible to non-native listeners. Taking one step further, Hayes-Harb et al., (2008) investigated the possibility to reflect the subtle nature of ISIB by further dividing ISIB into two sub-types: ISIB-T and ISIB-L. ISIB-T focused on speakers' L1 and "compares the intelligibility of native VS non-native speakers for non-native listeners" (2008: 665). However, ISIB-L focused on listeners' L1 and "compares the intelligibility of non-native speakers for native versus non-native listeners" (2008: 665). Their ISIB study on perceiving consonant stops demonstrated ISIB-L at work, but not ISIB-T. Such division of concept proved ISIB-L and ISIB-T to be an independent phenomenon (Hayes-Harb et al., 2008; Xie & Fowler, 2013).

Unlike the studies mentioned above, most other ISIB studies (Major et al., 2002; Munro et al., 2006; Lee & Xue, 2013) found ISIB to play a relatively minor role in NNS speech intelligibility. Study findings came out with mixed results when studies simultaneously measured mutual intelligibility of more than one L1. This implied that L1 was the factor that influences NNS-NNS intelligibility differently, depending on what the exact L1 was. For instance, in Munro et al. (2006), ISIB was demonstrated between L1 Japanese interlocutors, while there was no ISIB between L1 Cantonese interlocutors. ISIB showed the inconsistent pattern, even when it was separately observed in terms of ISIB-L and ISIB-T. Some studies found evidence for ISIB-L (Hayes-Harb et al., 2008; Lee & Xue, 2013; Xie & Fowler, 2013) but very mixed findings for ISIB-T. Although ISIB-T was found in some volume of studies (Bent & Bradlow, 2003; Stibbard & Lee, 2006), it was partially (Xie & Fowler, 2013) or not found (Hayes-Harb et al., 2008) in other volumes of studies.

Such mixed and inconsistent findings reinforced subtle nature of ISIB, which was the outcome in a combination of various listener background factors beyond L1. In other words, ISIB was not found to be an absolute factor that happens all the time and simultaneously. Rather, it was found to be the case-specific factor, depending on the L1 and the sub-types (i.e., ISIB-L or ISIB-T). In addition, ISIB was found with the combination of other factors than L1, such as listeners' familiarity with foreign accents (Major et al., 2002), or speakers' acoustic property (Munro et al., 2006). It implied that L1 effect may work with other kinds of listeners' background to determine the degree of mutual intelligibility between NNS-NNS communication. Hence, it is worth observing ISIB with additional listener background related variable, probably the non-linguistic factor.

C. Role of L2 English teaching background on NNS speech intelligibility

If the degree of ISIB is influenced by numbers of linguistic background factors, it would also be influenced by other non-linguistic background factors. One of the non-linguistic background factors that previous studies paid attention to was listeners' professional background (Brown, 1995; Galloway, 1980; Hadden, 1991; Kim, 2009). Previous studies on listeners' professional background were mostly done in language assessment field, an attempt to test the effect of rater characteristics to their assessment behavior. Rating behavior was often operationalized as consistency, rater bias (harsh/lenient), and evaluation focus. Most findings agreed that teacher listeners are more sensitive towards linguistic and pronunciation related factors. For instance, Hadden (1991) found that teachers were more critical about speakers' linguistic ability than non-teacher listeners. Galloway (1980) found that teachers were more critical, particularly in assessing elements like pronunciation and speech rate. Kim (2009) investigated the assessment propensity of Korean EFL teachers, in comparison to NS teachers under ESL Canadian students' oral performance assessment context. She found that NS teachers' comments were dealing with a more diverse aspect of speakers' speech other than pronunciation (i.e., strength of argument, fluency, specific grammar use, and coherence) in more elaborative fashion. In the meantime, Korean teachers' comments were mostly about general pronunciation, and their comments tended to deal with the global aspect of oral performance. In summary, although both were English teachers, each L1 group was focusing on different aspect of NNS speech. Lack of training about performance evaluation was suggested as a possible reason for Korean teachers' less detailed evaluation.

Although these studies were helpful to show how teachers' L1 led them to focus on different aspects of oral performance and evaluate students differently, it did not give enough empirical evidence to compare teachers' intelligibility or the rate of accuracy of NNS speech perception. Although the aforementioned studies provided some insights about L2 English teachers' behaviors as evaluators of NNS speech, these studies did provide not many insights about L2 English teachers' behaviors as listeners of NNS speech. I believe that their stance as evaluator and listeners should be considered separately; former is related to their role in assessing their students, while latter is related to their role as communication partner with NNS. This research gap must be filled because it's important to study the effect of L2 teaching background in NNS speech intelligibility. Extra empirical evidence on this end may give some important implication to L2 pronunciation teachers and researchers. For instance, study finding may be able to answer whether L2 English teachers' exposure to foreign-accented speech in the

classroom enhances mutual intelligibility between NNS listeners and speakers, especially the between speakers and listeners who share the same L1. In addition, claims or assumptions like teachers will be more adept in noticing the accentedness of their students could gain some empirical evidence.

Another gap found in previous intelligibility studies lies in ways to further categorize NNS listener group. ISIB studies after 2008 attempted to see if ISIB still is visible when certain conditions are changed: conditions include target form localization, task type variation, and participant subcategorization. For instance, Xie and Fowler (2013) further categorized their L1 mandarin learner participants, according to the origin of their L2 acquisition when testing ISIB-L and ISIB-T of L1 Mandarin speakers and listeners. L1 Mandarin listener belonged to M-US group if listener learned English in the US, and M-BJ group if listener learned English in Beijing. This study found that acoustic information is weighed differently, not only by listeners from the different L1 backgrounds but also by their L2 learning context. As shown, a more careful division of NNS listener group allowed more subtle and detailed insight to be added to the existing ISIB and mutual intelligibility literature.

To my knowledge, little is known about the existence of ISIB between participant groups with the varying level of L2 English teaching background so far. In attempt to fill this research gap, the present study further divided listener group according to their L2 English teaching background. It was done so to put intelligibly benefit into L2 English instructional context and investigate whether L2 English trained individuals have higher intelligibility towards foreign-accented speech. The findings from this study will tell us more about the effect of L2 English teaching background on foreign accent/world English perception. The earlier works converted claims of L1 effect and solidified it into theory, with the aid of empirical evidence. It might be the time to expand the coverage domain of past mutual intelligibility studies, beyond speech perception theory and L2 oral performance assessment.

III. Method

The present study conducted a non-native speech intelligibility test. In order to build up a test, speech sample of Korean and Native English speaker was collected. Their speech sample was cropped and embedded into a form of an online survey. 60 listener participants listened to the speech from 20 speakers and transcribed the sentence as much as they could. They also answered set of listener background questions after transcription test is done.

A. Speakers

There were 20 speakers who recorded speech samples: 16 Korean learners of English (Korean) and 4 Native Speakers of English (NE). All Korean speakers in the present study were aged 19 and above, with minimum undergraduate education level. This pool of participants was chosen because they are believed to represent the population group of adult L2 English learners, who are immediately expected to encounter evaluative gatekeeping situations where their English oral performance is closely related to their next life choices (i.e., higher education degree, job opportunities) around the world (Jenkins & Parra, 2003). Listeners' response to this pool of Korean speakers, therefore, will have implication in the evaluation that Korean learners of English may have outside of the L2 classroom. 4 NE speakers were present as the comparison group; ISIB was enabled to be measured in comparison of NE intelligibility and Korean intelligibility score. NE speakers were all English teachers with a minimum education level of Master's degree in TESOL. They all have had extensive English teaching experience in EFL countries (i.e., Korea, Japan, and Bahrain) for a minimum of three years.

B. Listeners

In addition to speaker participants, there were 60 listeners who participated in the intelligibility transcription task. There were 30 NE listeners and 30 Korean listeners. Both Korean and Native English listeners were either living in Korea or the United States. Most Korean listeners were from a university in Seoul, and most NE listeners were from a university in Flagstaff, Arizona. However, since the test was conducted online, Korean study abroad students in the United States and NE speakers in Korea also participated in this study. Although the questionnaire asked L2 English teaching and training experience in several other ways, this study only used the response from one question to make teacher/ non-teacher distinction. For instance, if the participant answered 'yes', they were categorized as 'L2 English teachers', and vice versa. As a result of the categorization, there were four participant groups in total; NE teacher, NE non-teacher, Korean teacher, and Korean non-teacher. Since this study was part of a larger project of 120 participants, 60 participants from that pool were randomly chosen and became part of present study's analysis. That enabled this study to have exactly 15 participants for each of four groups. No individual served both as speaker and listener. All the participants were volunteers and they were rewarded with either cash or gift card of their choice.

Teaching background questionnaire were found out with multiples of questions, including years of teaching English as L2, possession of TESOL certificate, major of highest education degree, and familiarity towards Korean accented English utterance.

Overall, thirty L2 English teacher listeners in this study earned a post-graduate degree with TESOL related majors such as English education, foreign language education, TESOL, or applied linguistics. In terms of years of teaching experience, they had L2 English teaching experience from 1 month to 7 years. As shown in table 1, NE teacher participants in this study had L2 English teaching experience for 6.07 years on average while Korean teachers had teaching experience in school for 4.58 years on average. Not only teacher listeners from this study had extensive L2 English teaching experience, they also had experience from various educational institutions. The questionnaire collected numbers of years they taught L2 English from three different educational contexts: public schools (i.e., elementary, middle, high), universities, Korean *hakwons*. L2 English teaching experience gained from private tutoring were not counted towards L2 English teaching experience. According to table 1, both NE teachers and Korean teachers had years of teaching experience in these institutions, varying from around 3.5 months to 2.69 years on average. Non-teacher listeners were comprised of adult listeners with non-TESOL related majors such as psychology, public health administration, chemistry, and civil engineering. None of them reported L2 English teaching experience. These two groups existed as control groups, to compare intelligibility of teacher groups with different language background.

<Table 1> Questionnaire Response about L2 Teaching Experience

	NE teacher	NE non-teacher	Korean teacher	Korean non-teacher
TESOL related majors (%)	100	0	100	0
Total teaching experience (years)	6.07	0	4.58	0
Teaching experience in public schools (years)	1.14	0	2.00	0
Teaching experience in universities (years)	2.24	0	0.37	0
Teaching experience in Korean <i>hakwons</i> (years)	2.69	0	2.21	0
Korean Accent Familiarity	3.8	2	4.8	4.53

In addition to L2 teaching experience, the present study included questionnaire answer about Korean accented English familiarity as well since previous studies showed that foreign accent familiarity is another influencing factor towards foreign-accented speech intelligibility (Gass & Varonis, 1984; Major et al., 2002). Listener participants self-reported their degree of familiarity towards Korean accented English. They could choose from 1 to 5 to indicate their familiarity from 5-point Likert scale: 1 indicating no

familiarity and 5 indicating great familiarity. As shown in table 1 above, two Korean listener groups reported higher familiarity towards Korean-accented English (i.e., 4.8 for Korean teacher group and 4.53 for Korean non-teacher group) than NE groups (i.e., 3.8 for NE teacher group and 2 for NE non-teacher group). Another notable point is that Korean teachers reported higher familiarity than NE teachers (i.e., 4.8 VS 3.8). The possibility of this accent familiarity factor towards the present study finding will be further discussed in later sections.

C. Stimuli

The stimuli used to build perception survey were speech recordings from two tasks, that were elicited from each speaker participants. This study measured the intelligibility of a single speaker with two different tasks: one longer picture description sentence (10-15 words) that syntactically makes sense, and one short read sentence (6-8 words) that syntactically does not make sense. The present study used both types of tasks simultaneously, in hope of enabling listeners “to assess diverse oral language output, which in turn might have elicited unknown or unexpected behaviors” (Kim, 2009: 191). In order to fully understand the characteristics of listeners with varying language and L2 English teaching background, gathering data and analyzing to see these factors at once seemed necessary. Table 2 below shows some example sentences elicited from each task.

<Table 2> Example of Task Sentences

Picture Description Task	Nonsense Task
A man and a woman walked to corner they have big green bag	The wrong shot led the farm
When they stand they pick up the suitcase and they go to home	The white bow had the bed

The suitcase story picture description task (Derwing, Munro, Thompson, & Rossiter, 2009) was chosen since it is one of the most widely used tasks in speech perception and production studies to measure NNS speaking competence. Hence, it makes the present study result comparable with the previous study findings to a certain extent. Other than that, the task assists NNS to form sentences and tell meaningful stories with the assistance of eight cut pictures, regardless of NNS' L2 English proficiency. The nonsense sentence reading task was chosen since it was found to be the best predictor for listeners' intelligibility (Kang, Moran, & Thompson, 2018), as listeners were not given with the content-related context to rely on while figuring out the speakers' utterance. In addition, it

was the effective task to figure out which segmental sound was easy or difficult for Korean learners of English to produce.

Two tasks were recorded in a single recording session with each speaker participant, in a quiet room in a university. During speech sample recording, only the researcher and speaker participant were present in the room. The monetary reward was given to each speaker participant. Each session took 10-30 minutes for each speaker participant. The speech recording was done with *Samsung Galaxy 6S* recording application. Each speaker participants were rewarded with either cash or gift certificate of their choice.

D. Procedure

Although each speaker recorded 30 to 60-second-long utterance for picture description task and 32 sentences for the nonsense task, the present study cropped one sentence (6-15 words) from each task and made sure listeners hear and transcribe around 16-25 words from each speaker. Once cropped, these audio stimuli were embedded into an online survey. The online survey was comprised of test instruction, embedded sound file, and space to transcribe the audio stimuli. The general design of the study was adapted from Bent and Bradlow (2003) and is broadly similar to Munro et al., (2006): the perception test in response to oral stimuli was in form of orthographic sentence transcription test. Despite the awareness of the trend to measure intelligibility using other methods such as lexical decision task (Lee, 2014; Lim, Han, Choi and Lee, 2016), this current study chose to stick with traditional intelligibility transcription task. It's because the method provided the rich resource for qualitative analysis, as well as quantitative analysis to carefully investigate the nature and characteristics of NNS-NNS intelligibility between L1 Korean learners of English. Orthographically transcribed listener response worked as the valuable resource to identify which specific segmental or suprasegmental features that NS and NNS perceive differently.

The survey was comprised of two subsections: intelligibility transcription tasks and listener background survey. In the transcription task, the participants listened to each speech sample as much as they want and transcribed what they had heard by typing onto the computer screen. 20 picture tasks were played first, and participants were allowed to take a short break. Afterward, 20 nonsense tasks were played. Listeners listened and transcribed at their own pace, as they took this transcription test at places and times of their convenience using online survey link. The salient difference between earlier ISIB studies and the present study is that this perception survey was done electronically using the *surveygizmo* survey link. The survey was chosen to be collected electronically so the data could be collected from a wider range of listeners across geographical regions including Korea, United States and few other countries (i.e., United Kingdom, Finland).

The whole intelligibility test lasted approximately 30-50 minutes. Each listener participants were rewarded with either cash or gift certificate of their choice.

E. Data Analysis

1. Quantitative analysis

As a result of aforementioned data collection procedure, 2400 orthographically transcribed sentences (40 sentences by 60 listeners) from the task were elicited. They were used to assess the intelligibility of each speaker. Scoring of the transcriptions was carried out using the exact-match method (Derwing & Munro, 1997; Munro et al., 2006), which involved counting the words correctly transcribed in each utterance. Minor errors such as trivial substitutions, use of contractions (i.e., *did not* for *didn't*), use of abbreviated forms (i.e., *wanna* for *want to*) were counted as the correct answer, as they did not affect the meaning of the sentence. As for nonsense task, if listener wrote homophone as answers (i.e., writing *kiss* when the original answer was *keys*) was also scored as the right answer, as they clearly demonstrated accurate perception of intended sounds.

Intelligibility scores were then calculated by dividing the number of correctly transcribed words into the total number of words in utterance and multiply it by 100 (i.e., $10/15 * 100 = 66.67\%$). Since listeners transcribed two separate utterances (i.e., one from picture description task and other from the nonsense task) from each listener, two sets of transcription scores of each speaker were calculated from each listener. In addition to scores for individual tasks, total intelligibility scores that each listener gained from each speaker was also calculated. In other words, intelligibility scores of the 20 speakers to each of the listener groups came out as percentages, as the maximum possible of 100 % Total intelligibility scores was calculated in percent form as a result of this calculation below:

Total intelligibility score (%) = [(number of words correctly transcribed for the nonsense task) + (number of words correctly transcribed for picture description task) / (total number of words in nonsense and picture description)] * 100

This study used only the total intelligibility score as a dependent variable, since listeners' response to two different nature tasks needed to be reflected. As a result, this study used 1200 total scores (20 speakers X 60 listeners) as a dependent variable.

2. Qualitative analysis

Along with quantitative analysis, listeners' orthographic transcriptions were further analyzed line by line, to trace the possible spots where listeners' L1 and professional background made huge group splits in transcription scores. In order to do so, mean scores for each speaker was computed and arranged into four listener groups: NE teachers, NE non-teachers, Korean teachers, and Korean non-teachers. Fig 1 shows the result of mean score distribution of speakers from 4 listener groups. As shown, Korean listener groups (marked in square and diamond) outperformed both Native English teachers (marked in a triangle) and non-teachers (marked in a circle) when they transcribed three speakers' utterance. They were namely SP 1, SP 5, and SP 9.

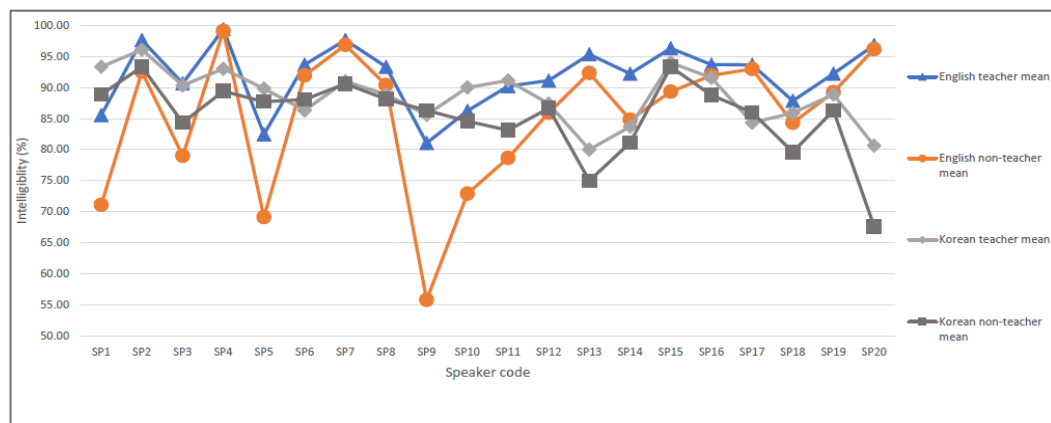


Fig 1. Distribution of Mean Transcription Score for Each Speaker

For qualitative analysis, the orthographic transcription that each participant answered for these three speakers (2 tasks x 20 lines x 3 speakers = 120 lines in total) were analyzed, by highlighting orthographic transcriptions of same listener groups with same colors (i.e., English teachers in purple, Korean non-teachers in yellow). Color coding arrangement allowed the author to see which words listeners in a certain group generally transcribed correctly, or incorrectly. The author picked 2-3 words from each task. The chosen words met at least one out of three conditions; (1) when both NE and Korean group seemed to make many mistakes, (2) when one group was noticeably better at transcribing accurately than the other group, and (3) when many different varieties of answer options outside the answer were observed. In total, 8 words/ phrases were chosen and analyzed as a result of this screening process; section 4.3 will discuss three of them.

IV. Results and Discussion

A. Single effect of language background on NNS speech intelligibility

In order to investigate the effect of listener background on mutual intelligibility and find the answer for the first research question, Factorial analysis of variance (ANOVA) was used for statistical analysis. The factorial ANOVA was appropriate statistical analysis for this study since the data contain two independent variables, different participants in each of the four groups, and one continuously scaled dependent variable (intelligibility score). Since the analysis was comprised of two independent variables (listeners' L1 and speakers' L1) with two levels (English, Korean), 2X2 factorial ANOVA was used. Listeners' L1 (Korean, English) was set as the between-subjects factor, and speakers' L1 (Korean, English) was set as the within-subjects factor.

The ANOVA revealed that there were significant main effects both for the speakers' L1 [$F(1,1196) = 25.45, P = .000$] and for the listeners' L1 [$F(1,1196) = 26.57, p = .000$]. In other words, there was the significant mean difference in intelligibility scores, depending on listener and speakers' L1. In addition, the interaction of speaker and listener group was also significant [$F(1,1196) = 29.503, p = .000$]. There was an interaction between two factors, which enabled the effect of listeners' L1 on intelligibility score for Korean speaker to be significantly different from the effect of listeners' L1 on intelligibility score for English speaker.

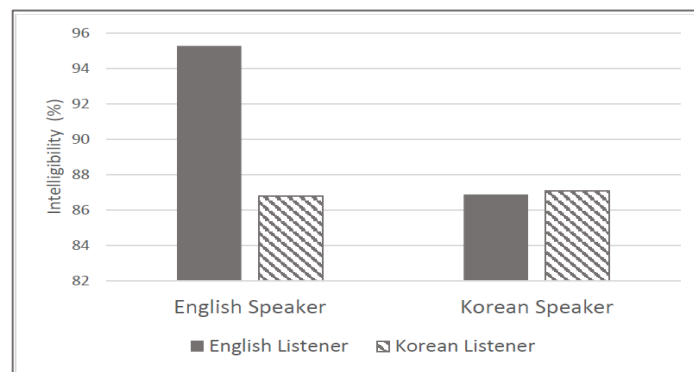


Fig 2. Intelligibility Score, Organized by Listener Group and Speaker Group

To answer the first research question about the single effect of language background, this study found evidence for ISIB-T or ISIB-L, as far as EFL Korean learners of English's speech is concerned. The result showed that when L1 (Korean) was between listeners and speakers, the score was slightly higher than when one of the party was NE speaker. As Fig 2 above indicates, Korean speakers' speech (87.08, bar 4) was more intelligible than NE speakers' speech (86.77, bar 2) for Korean listeners. In addition, Korean speakers' speech was more intelligible to Korean listeners (87.08, bar 4) than to NE listeners (86.86, bar 3). However, the effect of both ISIBs were not shown dramatically in terms of numbers. The present study presumes the effect of English listeners response to speakers' L1 as the main reason for this outcome. As shown in Fig 2, NE speakers' speech (95.27, bar 1) was more intelligible than Korean speakers' speech (86.86, bar 3) for NE listeners. Based on this finding, it is assumable that present study's interaction effect explains more of interaction of speakers' L1 when the listener is NE, rather than the interaction of speakers' L1 when the listener is Korean.

In this way, the present study finding was similar to that of previous studies which found evidence for ISIB-L (i.e., Xie & Fowler, 2013) and ISIB-T (i.e., Bent & Bradlow, 2003). However, even previous studies like Bent and Bradlow (2003) did not find evidence in favor of ISIB, when NNS speakers belonged to lower proficiency group; ISIB was only at work when NNS speakers had high L2 English proficiency. In other words, previous studies had L2 proficiency as an independent variable, rather than solely considering listener and speakers' language background and the L1 sharedness. Considering that this study set listeners' language background only with the L1, such difference in study design may account for the weak finding of the present study. The findings from previous and present studies add up to prove that listeners' language background alone play a relatively minor role in NNS-NNS communication, even if listeners and speakers were from the same language background.

B. The combined effect of listeners' language background and L2 English teaching background on NNS speech intelligibility

The follow-up analysis investigated the combined effect of language background with L2 English teaching background on mutual intelligibility, in order to answer the second research question. Factorial ANOVA was used again to answer this research question. However, unlike the previous analysis, listener group was divided into four groups instead of two. Listeners who used to be divided into English and Korean in the previous analysis were now further divided, according to listeners' L2 English teaching experience. Hence, 4X2 factorial ANOVA was used to answer RQ 2; there still were two independent variables, but now between-subjects factor (listener background) was in four

levels (NE teachers, NE non-teachers, Korean teachers, Korean non-teachers). Speakers' L1 (Korean, English) was set as the within-subjects factor, with the same level as analysis as section 4.1. The result of this test showed that there were significant main effects both for the speakers' [L1 $F(1,1192) = 18.31, p = .000$] and for the listeners' background (L1 x teaching experience) [$F(1,1192) = 27.00, p = .000$]. In other words, there was the significant mean difference in intelligibility scores, depending on speakers' L1 and L2 teaching background. In addition, the interaction of speaker and listener group was [$F(1,1192) = 12.99, p = .000$], proving that there was an interaction between two factors. This means that the effect of listeners' language background and L2 teaching experience on intelligibility score for Korean speakers is significantly different from that of NE speakers.

After main effect and interaction effect was found statistically significant, *Post hoc* pairwise comparisons of speaker intelligibility were conducted to find the significant differences within the array of comparisons. Tukey's HSD was used on six comparisons (i.e., NE teacher x NE non-teacher, NE teacher x Korean teacher, NE teacher x Korean non-teacher, NE non-teacher x Korean teacher, NE non-teacher x Korean non-teacher, Korean teacher x Korean non-teacher). A Bonferroni adjusted alpha ($.05/6 = .008$) was calculated to protect against making a Type 1 error. As a result, pairwise comparison between NE teacher and English non-teacher ($p = .000$), NE teacher and Korean teacher ($p < .001$), NE teacher x Korean non-teacher ($p = .000$), NE non-teacher x Korean teacher ($p < .001$), and Korean teacher x Korean non-teacher ($p = .002$) were all found to be statistically significant. Comparison between NE non-teacher x Korean non-teacher was the only non-significant ($p = .995$) combination. The later analysis discussed only five aforementioned statistically significant mean comparisons.

Fig 3 below represents the effect of listeners' language background and L2 English teaching background on NNS speech intelligibility. The most noteworthy observation from this analysis was that ISIB-L was found amongst listener groups when NNS listeners had L2 teaching experience. Although English teachers scored the highest amongst 4 groups when they transcribed Korean speakers' speech (90.78, bar 2), English non-teachers scored the lowest. They scored 82.93 points on average (bar 4), which was lower than that of Korean teachers' (88.69, bar 6). In other words, Korean speakers' speech was more intelligible to Korean teachers than to English non-teachers; this is the empirical proof of ISIB-L at work, which was not visible when NE listeners were teachers. As far as ISIB-T was concerned, Korean teacher listeners scored slightly higher when they transcribed Korean speakers' English speech (88.22, bar 6) than NE speakers' speech (88.69, bar 5). Korean non-teacher listeners also scored slightly higher when they transcribed Korean speakers' English speech (85.48, bar 8) than NE speakers' speech (85.31, bar 7).

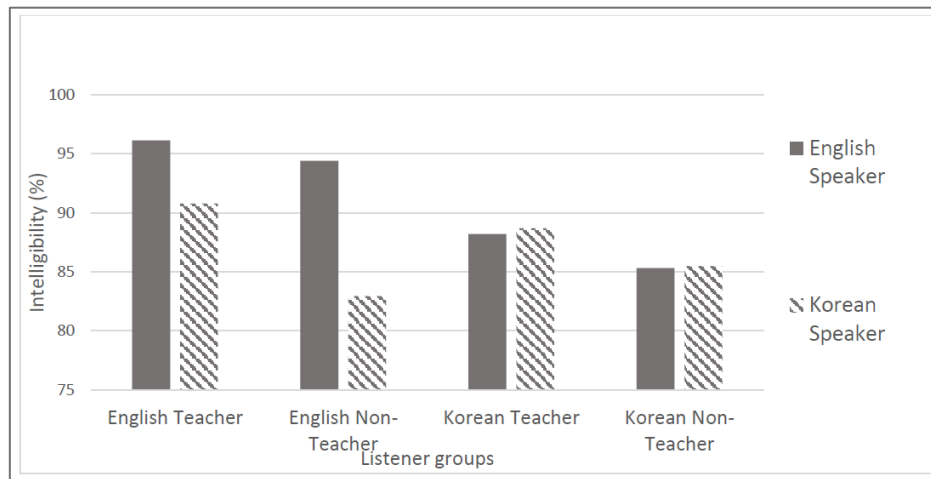


Fig 3. Intelligibility score organized by listener's language and teaching background

To answer the second research question about the combined effect of language background and L2 English teaching background, the present study found the significantly different outcome in terms of ISIB-L between English teachers and English non-teachers. While no ISIB-T and ISIB-L were found when Korean listeners' intelligibility were compared with that of NE teachers, ISIB-L was found when Korean listeners' intelligibility were compared with that of NE non-teachers. In other words, NNS Koreans were perceived more intelligible to trained L2 teacher listeners from same language background as them than to untrained NE listeners. This finding showed that recognizing and adding listeners' L2 teaching background in analysis actually made some meaningful difference, in terms of presence and absence of ISIB. In addition, Korean speakers were more intelligible towards listener group with L2 teaching experience and training than towards listener group without L2 teaching experience and training.

This finding may have occurred due to three factors. The first possible reason for this observation is teachers' enhanced exposure to foreign-accented speech. One of generally assumed premises about L2 oral proficiency development is that having more opportunities and access to NS of that L2 is helpful for learners of that L2, as it guarantees "regular exposure to the target language form and give them opportunities to use the language outside classroom" (Segalowitz & Freed, 2004: 174). Although this premise is used mostly to accredit the effect of L2 learners' study abroad, the present study would like to propose that this premise may be applied in reverse as well. In other words, having more opportunities and access to NNS and their interlanguage may enhance mutual intelligibility between listeners and speakers. Considering the fact that teacher listener participants (both NE teachers and Korean teachers) from the present study had about 4.5 to 6 years of mean L2 English teaching experience, as shown in table

1 from listener participant description in methods section, these yearly experience of teaching English as second or foreign language may have familiarized those teacher listeners with non-native variety of English speech. Especially, the average year that teacher listener participants worked in Korean *hakwon* was around 2.5 years which directly indicates these teacher participants' contact with Korean accented English in particular. Secondly, the findings also may be due to phonological training that L2 English teachers gained from their schools or from their job. It could be said that listeners with L2 teaching background may have activated their yearly L2 English teaching experience and descriptive knowledge of foreign-accented English utterance. This explanation is consistent with previous study findings on listeners' L2 teaching background which demonstrated teacher raters' tendency to base their rating on NNS linguistic ability and pronunciation (Galloway, 1980; Hadden, 1991). It can be said that teacher raters were able to base their evaluation on pronunciation and linguistic features because they were well aware of this prescriptive knowledge and activate that knowledge on the spot to make assessment-related decisions. Lastly, it may be due to the varying degree of familiarity towards Korean accented English between listener groups. According to table 1 above, the mean Korean accent familiarity of NE non-teacher was 2.0, which was almost as half as NE teachers' mean accent familiarity (3.8). Even though Korean listeners' accent familiarity was almost close to the maximum of 5, Korean teachers' familiarity (4.8) was nevertheless higher than that of Korean non-teachers (4.5). Considering the fact that this different mean accent familiarity scores went hand in hand with their intelligibility test scores, except for ranking of Korean teacher and NE teacher, this finding is consistent with previous mutual intelligibility studies (Derwing & Munro, 1997; Gass & Varonis, 1984; Lee, Han, Choi, and Lim, 2012; Kennedy & Trofimovich, 2008) which found the positive correlation between intelligibility and accent familiarity.

C. The qualitative difference between NS-NNS and NNS-NNS intelligibility

In so far, this paper depicted NNS-NNS mutual intelligibility in terms of quantitative analysis outputs. In order to find out how NNS-NNS intelligibility differs from NS-NNS intelligibility when NNS listener is L2 English teacher, however, qualitative line-by-line analysis of listeners' orthographic responses was necessary. Fig 4, 5, 6 show the result from the qualitative analysis; they are the diagrams which stylistically display different listener perception pattern towards the same audio stimulus. The results were arranged according to four listener groups, in order to discover some form of pattern between right and wrong answers. It was arranged also to find the possible phonological reasoning

behind different options of transcriptions. Fig 4 and 5 were the utterances from the nonsense task, and Fig 6 was the utterance from picture description task.

Fig 4 below shows the distribution of different answers that each group wrote when they heard the word *soul* from SP 1's nonsense utterance *The clean soul tapes their keys*. As shown in Fig 4 in the black shade, far more Korean teachers and Korean non-teachers transcribed correctly (i.e., 8 Korean teachers, 6 Korean non-teacher) than English teachers and English non-teachers (i.e., 3 English teachers, and 1 English non-teacher). Instead of *soul*, both English listeners mostly transcribed *sword* (i.e., 8 for English teacher and 7 for English non-teacher), shown in square shade. In other words, word-final liquid /l/ in *soul* was perceived to be word-final liquid /r/ combined with /d/ for many L1 English listeners, perceiving that they heard the consonant cluster. In course, NE listeners perceived the originally intended message *soul* as *sword*, which is a semantically remote concept.

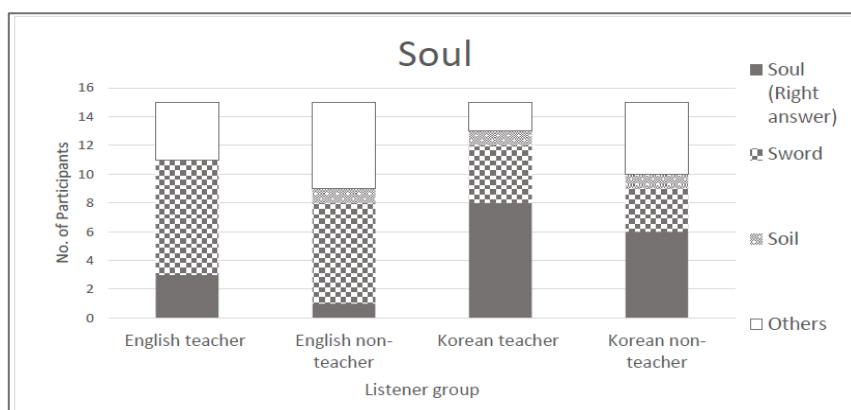


Fig 4. Response to *Soul* arranged by listener group

Fig 5 shows the distribution of different answers that each group wrote when they heard the word *earth* from SP 5's nonsense utterance *Your fine lip tired the earth*. As shown in Fig 5 in black shades, far more Korean teachers and Korean non-teachers answered correctly (i.e., 13 Korean teachers and 14 Korean non-teachers) than NE teachers and NE non-teachers (i.e., 1 for English teacher and 0 for English non-teacher). Instead of *earth*, both NE listeners mostly transcribed *arse* (i.e., 8 for English teacher and 4 for English non-teacher) or *us* (i.e., 5 English teachers and 4 English non-teachers), as marked in square shades. In both cases, NE listeners heard mid center vowel /ɜ/ in *earth* into low back vowel such as /ɑ/ in *arse*, or mid back vowel /ʌ/ in *us* (as marked in grey dotted shades). In other words, NE listeners perceived vowel sound to be positioned at the back, with lower tongue position. Not only vowels were heard differently from intended

sound, but also the consonants were heard differently; *arse*, *us*, *horse* were all words with word-final /s/ in, instead of /θ/.

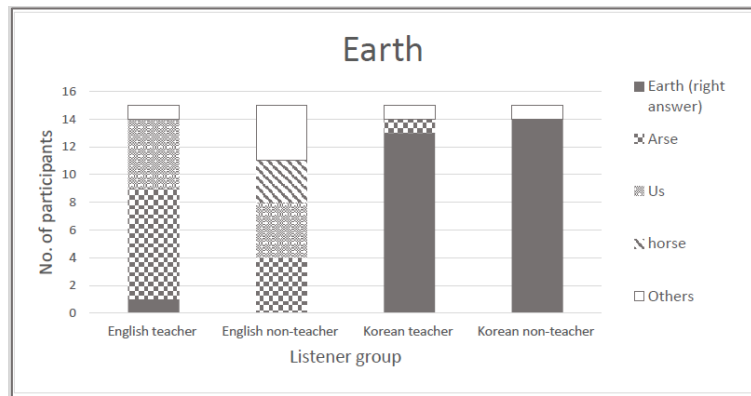


Fig 5. Response to *Earth* arranged by listener group

Fig 6 below shows the distribution of different answers that each group wrote when they heard the world *when they stand* from SP 9's picture description utterance *When they stand they pick up the suitcase and go home*. As shown, far more Korean teachers and Korean non-teachers answered correctly (12 Korean teachers and 10 Korean non-teachers) than English teachers and English non-teachers (8 English teachers and 2 English non-teachers).

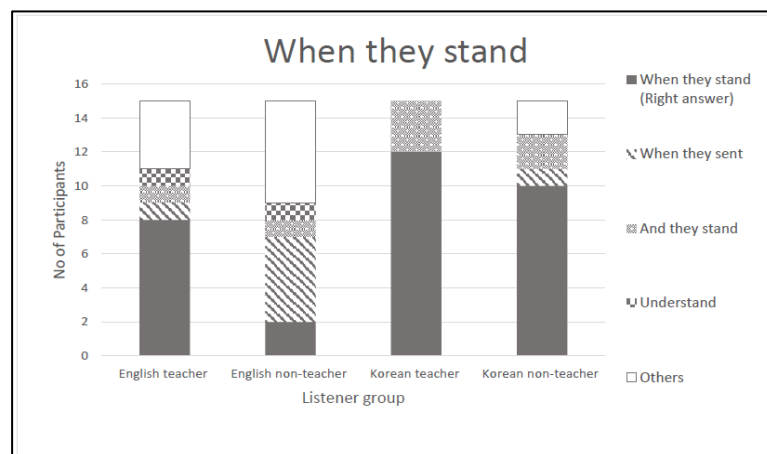


Fig 6. Response to *When they stand* arranged by listener group

Interesting points about deviation patterns, in this case, was that there were no dominant alternative answers existed. Note that 'others' option (marked in white shades) occupied the huge part of each English listeners' responses. Part of the reason was that unlike nonsense tasks where no context existed to limit listeners' cognitive guessing to one word, picture description task allowed listeners to connect speeches differently, according to the sounds they hear. For instance, while some listeners made word-level deviations like substituting /d/ into /t/ (i.e., *sent* instead of *stand*) or omitting /w/ (i.e., *and* instead of *when*), some connected speeches in creative and totally different ways (i.e., *understand*, and *there's tent*) from the original utterance.

To sum up, the qualitative analysis allowed the present study to answer this question to a certain extent, by taking a closer look at some situational context where Korean listeners demonstrated more accurate perception of NNS speech, and where English listeners misunderstood the NNS speech. The present study's qualitative analysis visualized how variably NNS speech could be heard to different groups of listeners, simulating different possible scenarios of understanding or misunderstanding that NNS may face while communicating with NS or NNS. While quantitative analysis is efficient in drawing generalizable propensity between listener groups with varying background factors, qualitative analysis is efficient in envisioning prototypes of misperceived utterance. To elaborate, seeing orthographically transcribed perception variety may enable L2 pronunciation researchers and instructors to realize what could NNS speech actually sound like to listener groups with varying language and professional background. For instance, as Fig 4 showed, hearing /l/ into /r/ turned originally intended message *soul* into *sword*, which is a semantically remote set of words. This form of misperception can possibly cause confusion and mild miscommunication in the midst of communication. Fig 5 envisioned even more serious possible miscommunication, as many NE listeners misheard intended *earth* into *arse*, the word that is not only out of context but also profane. In the same situation, however, if the other communicative party is Korean, they would figure out the intended word relatively effortlessly and keep the conversation going. This kind of observation may consequently assist to speculate the severity of the consequence of miscommunication and enable L2 pronunciation researchers and instructors to come up with communication strategies to prevent or counter the mishaps of miscommunication.

VI. Conclusion

The present study attempted to investigate the combined effect of listeners' L2 English teaching background and language background on the intelligibility of Korean

learners of English's speech. In order to do so, this study addressed three research questions as such: (1) what is the single effect of language background on NNS speech intelligibility benefits? (2) what is the combined effect of language background with L2 English teaching background on NNS speech intelligibility benefits? (3) How does NNS-NNS intelligibility differ from NS-NNS intelligibility when NNS listener is L2 English teacher?

All in all, this study's attempt to integrate listeners' language background with L2 English teaching background related to L2 pronunciation instruction was partially successful. While ISIB-T nor ISIB-L were found subtly when listener group was divided solely based on listeners' language background variable, ISIB-L was found when listener group was divided based on two listeners' background variables: language background and L2 English teaching background. In this sense, the present study strengthens the thought to view mutual intelligibility as the subtle and context-specific phenomenon, which is affected sensitively by multitudes of listener background factors. In addition, adding L2 English teaching experience variable to conventional mutual intelligibility study design allowed the present study to indirectly show the positive effect of L2 English teaching towards NNS speech intelligibility. This study found that intelligibility score for Korean teacher listeners was higher than English non-teachers when listening to Korean speakers' utterance. This leaves pedagogical implication about NE speakers without L2 English professional background may have trouble clearly understanding NNS speech, which may challenge their ability to accommodate and converge with their students' interlanguage. Reversely speaking, Korean teachers may be better at listening and understanding Korean learners' interlanguage and come up with the subsequent strategy to accommodate their students.

Findings from both analyses agree with many previous studies about NNS speech intelligibility and ISIB; even previous studies which found the strong presence of ISIB studies did not find strong and significant language background effect across all cases of NNS-NNS communication. In this sense, the present study gives additional proof of relatively subtle nature of intelligibility benefit (Hayes-Harb et al., 2008), which is moderated sensitively by multitudes of listener background factor. Another noteworthy finding from the quantitative analysis is regarding the intelligibility of Korean listeners with L2 English teaching background. Korean teachers demonstrated higher intelligibility than English non-teacher group towards Korean speakers' speech. There are three possible sources of such finding; enhanced exposure to foreign-accented speech, phonological training that L2 English teachers received from their schools or from their job, and varying degree of familiarity towards Korean accented English between listener groups. The present study also made a contribution to integrate qualitative approach with the quantitative one. The qualitative analysis and interpretation of participants'

orthographic response to Korean-accented English speech showed that Korean teachers were more intelligible in perceiving some NNS speech. An interesting fact is that those three speakers that Korean teachers demonstrated higher intelligibility were all speakers with relatively lower English proficiency amongst the speaker participant group. This implies that in L2 pronunciation classrooms in EFL context, Korean teachers may do a good job in beginning level pronunciation teaching and learning. The mixed-method approach allowed the study to show that trained L2 English teachers from each language background can help students in different ways regardless of their language background.

Despite some salient significance, some limits still remained. The biggest limitation is that this study set teaching experience as the categorical variable, instead of the continuous variable. In this study, teaching experience was treated dichotomously; listener participant either was or was not a teacher. This, however, is the over-simplified way to operationalize L2 English teaching background, which only limitedly reflects the complex nature of the variable such as this. Future study suggestion is that this variable should be treated as a continuous variable, and individual difference within teaching experience (i.e., years of teaching, places of teaching) should be further coded and computed. With more sample sizes, alternative statistical analysis can be done to reflect such difference indices of L2 English teaching experience in more in-depth ways. Instead of factorial ANOVA, Stepwise multiple regression is one possible alternative option to count teaching background into future mutual intelligibility study, since its more appropriate statistical analysis method for continuous independent variables. Another limitation is that this study investigated the response of listeners from only two L1: Korean and English. This may have lessened the effect of language background of ISIB, since the only comparison group was NES. If NNES listener group with other L1 (i.e., Mandarin, Spanish) also was present and compared with Korean and NE group, ISIB might have observed more conspicuously. Thus, future study suggestion is to add one or more listener group whose L1 is not English and does not share much phonological characteristic with Korean.

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